SYMBOLS AND NOTATIONS

A = total area (Chapter 3), area of footing (Chapter 7), cross-sectional area of pile material (Chapter 10), cross-sectional area of the socket (Chapter 11), cross-sectional area of the pile in square inches (Chapter 13)

A_b = effective area of the tip of the shaft in contact with the soil (Chapter 11)

A_f = coefficient-A at the point of failure (Chapter 3)

A_p = gross end area of the pile (Chapter 10), cross-sectional area of the tip of the pile (Chapter 10)

A_r = ram cross-sectional area (Chapter 10)

A_s = area of the wire in the spring (Chapter 3), side surface area of the pile (Chapter 10), surface area of the shaft in contact with the soil (Chapter 10)

A_w = area covered by water, water area (Chapter 3)

a_v = coefficient of compressibility (Chapters 3 and 7)

B = width of footing (Chapters 7, 9), pile diameter (Chapter 10), diameter of the base of the shaft (Chapter 11), socket diameter (Chapter 11), diameter of footing or equivalent length of a side for a square or rectangular shape (Chapter 13), pile diameter (Chapter 13)

B_b = diameter of socket (Chapter 11), diameter of drilled shaft (Chapter 11)

b = base inclination factors (Chapter 7), diameter (width) of the pile (Chapter 14)

C = parameter describing the effect of repeated loading on deformation (Chapter 14)
C_1 = coefficient to reflect arching-compression relief (Chapter 9)
C_2 = coefficient to reflect creep with time (Chapter 9)
C_α = coefficient of secondary compression (Chapter 3)
C_c = coefficient of curvature (also called the *coefficient of gradation*) (Chapter 3), compression index (Chapter 3)
C_d = effective perimeter of the pile (Chapter 10)
C_f = correction factor for K_δ when $\delta \neq \phi$ (Chapter 10)
C_u = uniformity coefficient (Chapter 3)
C_w = bulk modulus of water (Chapter 3), settlement coefficient (Chapter 13)
C_ε = strain index (Chapter 3)
c = cohesion (Chapters 6 and 7), undrained shear strength of soil (Chapter 10), undrained shear strength at the tip of the pile (Chapter 10), undrained shear strength at depth z (Chapter 14)
c_a = adhesion between the clay and the pile (Chapter 10), pile soil adhesion (Chapter 10), average undrained shear strength (Chapter 14)
c_m = mean undrained shear strength along the pile (Chapter 10)
c_n = undrained shear strength of normally consolidated clay (Chapter 10)
c_s = spacing of discontinuities (Chapter 11)
c_u = value of undrained shear strength (saturated clays) (Chapter 7), undrained shear strength at depth z (Chapter 11), average undrained shear strength of clay (Chapter 11)
c_v = coefficient of consolidation (Chapters 3 and 7)
c_w = term to adjust for the position of the water table (Chapter 9)
c_x = undrained shear strength at depth x (Chapter 10)
D = diameter of the vane (Chapter 4), depth along the piles at which the effective overburden pressure is calculated (Chapter 10), pile diameter (Chapters 10 and 12)
D_c = critical depth (Chapter 10)
D_f = ground surface (Chapter 7), depth below ground surface (base of the foundation) (Chapter 7), depth of overburden (Chapter 9)
D_i = thickness of a single segment (Chapter 10)
D_r = relative density, decimal fraction (Chapter 13)
D_s = depth of socket measured from the top of rock (not the ground surface) (Chapter 11)
D_w = depth to the water table from the ground surface (Chapter 9)
d = depth factors (Chapter 7)
dA = differential area of the perimeter along the sides of the drilled shaft over the penetration depth (Chapter 11)
E = modulus of elasticity (Chapters 9, 10, and 14), $(\sigma_1 - \sigma_3)$ (Chapter 9), efficiency factor (1 or <1) (Chapter 15), Young's modulus (Chapter 13)

E_b = Young's modulus of the granular geomaterial beneath the base of the drilled shaft, which can be different from E_{sL} (Chapter 13)
E_c = Young modulus of the shaft's cross section (Chapter 11), Young's modulus of the composite (steel and concrete) cross section of the drilled shaft (Chapter 13)
EI = nonlinear bending stiffness (Chapter 14)
E_i = Young's modulus of the recovered, intact core material (Chapter 11), the equivalent Young's modulus of the concrete in the socket, considering the stiffening effects of any steel reinforcement (Chapter 11)
E_{ir} = initial modulus of the rock (Chapter 14)
E_m = mass modulus of elasticity (Chapter 11), Young modulus of the shaft's rock mass (Chapter 11), Modulus of the in situ rock (Chapter 11)
E_p = arbitrary modulus of deformation related to the pressuremeter (Chapter 4)
E_pI_p = bending stiffness of the pile ($F - L^2$) (Chapter 12)
E_{pp} = reduced value secant to a p-y curve with pile deflection (Chapter 14)
E_pI_p = value of bending stiffness of a reinforced concrete pile (Chapter 14)
E_{py} = modulus (F/L) or a parameter that relates p and y (Chapter 12)
$E_{py\ \max}$ = initial slope of the p-y curve (Chapter 14)
E_s = stiffness of sand (Chapter 9), modulus for sand (Chapter 9), Young's modulus of the material in the softer seams within the harder weak rock (Chapter 11), soil modulus, kPa/m (Chapter 13)
E_{sL} = Young's modulus of the granular geomaterial along the sides of the socket at the base level (Chapter 13)
E_{sm} = Young's modulus of soil at the mid-depth of the socket where the decomposed rock becomes stronger with depth (Chapter 13)
$E_{s\ \max}$ = slope of the initial portion of the stress-strain curve in the laboratory (Chapter 14)
e = void ratio (Chapters 3 and 7)
F = shearing force (Chapter 3)
F_a = active force (Chapter 14)
F_h = horizontal force at the pile head (Chapter 15)
F_p = passive force (Chapter 14)
F_{pt} = total lateral force (Chapter 14)
F_s = global factor of safety (Chapter 8)
F_v = vertical force at the pile head (Chapter 15)
f = unit load transfer in skin friction (Chapter 10), load transfer in side resistance (Chapter 13), unit load transfer, kPa (Chapter 13)
f_c = cone resistance (Chapter 4)
$f_{\max}$ = peak soil friction (taken as the mean undrained shearing strength) (Chapter 10), maximum unit load transfer, kPa (Chapter 13)

f_s = average skin friction (Chapter 10), ultimate skin resistance per unit area of shaft C_d (Chapter 10), ultimate load transfer in side resistance at depth z (Chapter 11), ultimate side resistance in units of lb/in.^{2} (Chapter 11)
f_{sz} = ultimate unit side resistance in sand at depth z (Chapter 11)
f_x = unit resistance in clay at depth x measured from ground surface (Chapter 10)
G_s = specific gravity of the mineral grains (Chapter 3)
g = ground inclination factors (Chapter 7)
H = total thickness (Chapter 3), height (Chapter 4), horizontal component (Chapter 7)
H_B = horizontal force component parallel with short sides B (Chapter 7)
H_f = hydraulic load factor (Chapter 11)
H_L = horizontal force component parallel with long sides L (Chapter 7)
h = height of ram fall, in feet (Chapter 10), increment length or dx (Chapter 13)
I = inertia (Chapters 12 and 14)
I_r = rigidity index of the soil (Chapter 11)
I_z = vertical strain factor (Chapter 9)
I_ρ = influence coefficient (Chapter 11)
i = inclination factors (Chapter 7), hydraulic gradient (Chapter 7)
J = experimentally determined parameter (Chapter 14)
K = a constant in ft^3 for finding shear strength (Chapter 4), vane constant, depending on its shape (Chapter 4), coefficient of lateral earth (ratio of horizontal to vertical normal effective stress) (Chapter 10), lateral earth pressure coefficient (Chapter 10), a parameter that combines the lateral pressure coefficient and a correlation factor (Chapter 11)
K_0 = coefficient of earth pressure at rest (Chapters 4 and 14)
K_A = minimum coefficient of active earth pressure = $\tan^2(45 - \phi/2)$ (Chapter 14)
K_b = a fitting factor (Chapter 13)
K_s = fitting factor (Chapter 13)
K_{sp} = empirical coefficient that depends on the spacing of discontinuities (Chapter 11), empirical coefficient that depends on the spacing of discontinuities and includes a factor of safety of 3 (Chapter 11)
K_δ = coefficient of lateral stress at depth v (Chapter 10)
k = spring constant (Chapter 3), coefficient of permeability (Chapter 3)
k_c = constant (Chapter 10)
k_{ir} = dimensionless constant (Chapter 14)
k_{rm} = constant, ranging from 0.00005 to 0.0005 (Chapter 14)

L = flow distance (Chapter 3), limited length of the foundation (Chapter 7), penetration of the pile below ground surface (Chapter 10), length of the pile in contact with the soil (Chapter 10), penetration of the drilled shaft below ground surface (Chapter 11), penetration of the shaft (Chapter 11), depth of embedment of the drilled shaft (Chapter 11), penetration of the socket (Chapter 11), center-to-center distance between piles (Chapter 12), socket length (Chapter 13)
L_c = length of the core (Chapter 11)
L_e = embedded pile length (Chapter 10)
LI = liquidity index (Chapter 3)
LL = liquid limit (Chapter 3)
M = empirical factor that depends upon the fluidity of the concrete as indexed by the concrete slump (Chapter 11), moment (Chapter 12)
M_s = moment at the pile head (Chapter 15)
M_t = applied moment at the pile head (Chapters 12 and 14)
m = mean vertical effective stress between the ground surface and the pile tip (Chapter 10), parameter for cohesive intermediate geomaterial (Chapter 11)
m_R = mean value of resistance R (Chapter 8)
m_S = mean value of loads S (Chapter 8)
m_v = coefficient of volume compressibility (Chapter 7)
N = vertical force (Chapter 3), number of cycles of load application (Chapter 14)
N_{60} = Standard Penetration Test (SPT) penetration resistance, in blows per foot, for the condition in which the energy transferred to the top of the drive string is 60% of the drop energy of the SPT hammer (Chapter 11)
N_c = bearing capacity factor (Chapters 7, 9, and 13)
N'_c = bearing capacity factor (Chapter 7)
N_q = bearing capacity factor (Chapters 7 and 10)
N'_q = bearing capacity factor (Chapters 7 and 10)
N_{SPT} = corrected blow count from the SPT (Chapter 9)
N-value = sum of the number of blows needed to drive the sampler through the second and third intervals (Chapter 4).
N_γ = bearing capacity factor (Chapter 7)
N'_γ = bearing capacity factor (Chapter 7)
n = number of drainage boundaries (Chapter 3), number of segments (Chapter 10), number of piles (Chapter 10), characteristic parameter (Chapter 11), number of piles in a group (Chapter 15)
OCR = overconsolidation ratio (Chapter 11)
P = force applied (Chapter 3), compressive force (Chapter 13), axial force in the pile, in pounds (downward position) (Chapter 13)
P_a = allowable pile capacity (Chapter 10)

PI = plasticity index (Chapters 3 and 10)
P_s = force in the spring (Chapter 3)
P_t = lateral load (shear, horizontal) (Chapters 12 and 14), lateral force at the pile head (Chapter 15), axial force (Chapter 13)
P_u = ultimate pile capacity (Chapter 10)
P_{ult} = failure load (Chapter 10)
P_w = force in the water (Chapter 3)
P_x = axial force (Chapter 15), axial load on the pile (Chapter 14)
$P - \Delta$ = effect of axial loading on bending moment (Chapter 14)
p = total normal stress on the plane of failure (Chapter 6), intensity of the load on a homogeneous, isotropic, elastic half-space (Chapter 9), unit load (Chapter 9), steam (or air) pressure (Chapter 10), reaction from the soil due to deflection of the pile (F/L) (Chapter 12), soil resistance (Chapter 14)
p_0 = overburden pressure (Chapter 9)
p_a = atmospheric pressure (Chapter 11)
p_{c2} = ultimate soil resistance (Chapter 14)
$\overline{p}_d$ = effective overburden pressure (Chapter 10)
p_l = limit pressure (Chapter 4)
p_u = ultimate soil resistance (Chapter 14)
p_{u1} = ultimate resistance near the ground surface per unit of length along the pile (Chapter 14)
p_{u2} = ultimate resistance (Chapter 14)
p_{ur} = ultimate strength of rock (Chapter 14)
p_1^* = net limit pressure (Chapter 4)
$\overline{p}$ = effective stress = γ_x (Chapter 10), effective overburden pressure (Chapter 10)
Q = total outflow volume of water (Chapter 3), concentrated vertical load (Chapter 7)
Q_b = axial capacity in end bearing (Chapter 11)
Q_D = load at failure of the stripe footing (Chapter 7)
Q_d = ultimate bearing capacity (Chapter 7)
Q_f = skin-friction resistance (Chapter 10), axial load capacity in skin friction (Chapter 10)
Q_g = total capacity of the group (Chapter 10)
Q_{max} = maximum value (Chapter 13)
Q_p = total end bearing (Chapter 10), axial load capacity in end bearing (Chapter 10), tip load, kN (Chapter 13)
Q_s = total skin friction capacity (Chapter 10), capacity of a reference pile that is identical to a group pile but is isolated from the group (Chapter 10), axial capacity in skin friction (Chapter 10), total load in side resistance (Chapter 11)
$Q_{s\,\mathrm{max}}$ = maximum side resistance (Chapter 13)
Q_{ST} = load at the top of the socket (Chapter 11)
Q_t = load still in the shaft at the top of the socket (Chapter 11), given the load at the top of the socket (Chapter 13)

Q_{ult} = ultimate axial capacity of the drilled shaft (Chapter 11)
$(Q_{\text{ult}})_G$ = ultimate axial capacity of the group (Chapter 15)
$(Q_{\text{ult}})_p$ = ultimate axial capacity of an individual pile (Chapter 15)
q = total water flow rate (Chapter 3), flow rate of water from the soil (Chapter 3), bearing pressure on the foundation (Chapter 9), unit load transfer in end bearing (Chapter 10), unit end-bearing resistance (Chapter 10)
q_a = allowable soil-bearing stress (Chapter 9), net bearing pressure (Chapter 9), allowable bearing pressure (Chapter 11)
q_b = base resistance (Chapter 11), failure stress in bearing at the base of the footing (Chapter 13)
q_c = cone pressure (Chapter 4), static-cone-bearing capacity (Chapter 9)
$\overline{q}_c$ = variable values of static-cone-bearing capacity (Chapter 9)
q_d = ultimate bearing stress (Chapter 9)
$q_{\max}$ = unit end-bearing capacity (Chapter 11)
q_p = bearing capacity at the pile tip (Chapter 10)
q_u = unconfined compressive strength (Chapter 6), compressive strength (Chapter 11), average unconfined compressive strength of rock cores (Chapter 11), uniaxial compressive strength of the rock or concrete (Chapter 11)
q_{ult} = bearing stress at failure (Chapter 5)
q_{ur} = compressive strength of the rock, usually lower-bound, as a function of depth (Chapter 14)
RMR = rock mass rating (Chapter 14)
R_m = $(E_pI_p)_m$, bending stiffness of the pile at point m (Chapter 14)
RQD = rock quality designation (Chapters 4 and 14).
R^* = resistance (Chapter 8)
r = horizontal distance from point N to the line of action of the load (Chapter 7)
r_c = core recovery ratio (Chapter 11)
r_m = mean resistance or strength (Chapter 8)
S = settlement at any time (soil, piston, etc.) (Chapter 3), compression of the spring (Chapter 3), slope (Chapter 12)
S^* = loading (Chapter 8)
S_a = settlement in apparatus (Chapter 3)
S_r = degree of saturation (Chapter 3)
S_S = settlement according to the Schmertmann method (Chapter 9)
S_t = total settlement (Chapter 3), rotation of the top of the pile (Chapter 14)
S_u = ultimate settlement (Chapter 3)
s = shear strength (Chapter 4), shear resistance of soils (Chapter 6), shape factors (Chapter 7), amount of point penetration per blow, in inches (Chapter 10), parameter for cohesive intermediate geomaterial (Chapter 11)
s_m = mean value of the load (Chapter 8)

s_u = operational undrained shearing of the geomaterial beneath the base (Chapter 11)
SPT = Standard Penetration Test (Chapter 4)
T = torque (Chapter 4), relative stiffness factor (Chapter 12)
T_v = time factor (Chapter 7)
t = time (Chapter 3)
$t - z$ = load transfer curves (Chapter 13)
t_{yr} = time in years (Chapter 9)
U = average degree of consolidation (Chapter 3), pile displacement needed to develop side shear (taken as 0.1 in.) (Chapter 10)
u = water pressure (Chapter 3), porewater pressure (Chapters 3, 4, and 6), temperature (excess porewater pressure) (Chapter 7)
u' = excess porewater pressure (Chapter 3)
u_s = static porewater pressure (Chapter 3)
V = total volume (Chapter 3), vertical component (Chapter 7), shear (Chapter 11)
V_0 = volume of the measuring portion of the probe at zero reading of the pressure (Chapter 4)
V_m = corrected volume reading at the center of the straight-line portion of the pressuremeter curve (Chapter 4)
V_s = volume of solid mineral grains (Chapter 3)
V_v = volume of voids (Chapter 3)
V_w = original volume of water (Chapter 3)
v = average velocity of water flow in soil (Chapter 3), Poisson's ratio (Chapters 4, 9, and 13), inclination of the base of the foundation (Chapter 7), Poisson's ratio of the solid (Chapter 9), secant modulus (Chapter 13), Poisson's ratio of the geomaterial (Chapter 13)
v_0 = volume at the beginning of the straight-line portion of the curve (Chapter 4)
v_f = volume at the end of the straight-line portion of the curve (Chapter 4)
W = total weight (of sample) (Chapter 3), distributed load in force per unit of length along the pile (Chapter 13)
W_d = dry weight (weight after drying) (Chapter 3)
W_r = weight of ram (for double-acting hammers includes weight of casing) (Chapter 10)
W_w = weight of water (in the sample) (Chapter 3)
w = pile movement (Chapter 10), settlement of the base of the drilled shaft (Chapter 11), pile movement, *m* (Chapter 13), settlement, *m* (Chapter 13)
w_b = settlement of the footing or base of the pile (Chapter 13)
w_t = settlement at the top of the socket (Chapter 11), corresponding elastic settlement for a given load at the top of the socket (Chapter 13)

w_{t1} = settlement at the top of the socket at the end of segment 1 (Chapter 13)
x = coordinate along the pile measured from the pile measured from the top (L) (Chapter 12)
x_t = movement of a pile head (Chapter 15)
Y_t = lateral deflection at the pile head (Chapters 14 and 15)
y = deflection (Chapter 12)
y_{50} = deflection under a short-term static load at one-half of the ultimate resistance (Chapter 14)
y_c = deflection under N-cycles of load (Chapter 14)
y_s = deflection under a short-term static load (Chapter 14)
y_t = pile head (Chapter 12), deflection at the top of the pile (Chapter 14)
z = depth (Chapters 3 and 4), vertical distance between a point N within a semi-infinite mass that is elastic, homogeneous, and isotropic (Chapter 7), depth coordinate (Chapter 10), depth below ground surface (Chapter 11), ground surface (Chapter 12), pile displacement at depth x (Chapter 13), depth from the ground surface to the p-y curve (Chapter 14)
z_{bot} = depth to the bottom of the zone considered for side resistance (Chapter 11)
z_c = distance from the top of the completed column of concrete to the point in the borehole at which σ_n is desired (Chapter 11)
z_r = depth where a transition occurs (Chapter 14), depth below the rock surface (Chapter 14)
z_t = pile-head displacement (Chapter 13)
z_{tip} = pile-tip displacement (Chapter 13), pile-tip movement (Chapter 13)
z_{top} = depth to the top of the zone considered for side resistance (Chapter 11)
z_w = vertical distance below the water table (Chapter 3), depth from the top of the concrete to elevation of the water table (Chapter 11)
Σt_{seams} = summation of the thicknesses of all of the seams in the core (Chapter 11)
α = adhesion factor (Chapter 10), dimensionless factor depending on the depth–width relationship of the pile (Chapter 10), empirical adhesion coefficient (Chapter 10), empirical factor that can vary with the magnitude of undrained shear strength, which varies with depth z (Chapter 11), constant of proportionality (Chapter 11)
α_c = angle of the inclined plane with the vertical (Chapter 14)
α_p = pile-head rotation (Chapter 15)
α_r = strength reduction factor, b = diameter of the pile (Chapter 14)
α_s = rotation of the structure (Chapter 15)
α_x = coefficient that is a function of c_x (Chapter 10)

β = inclination of the ground (Chapter 7), pile composite factor (Chapter 15)
βL = nondimensional length of the pile (Chapter 14)
Δe = change in the void ratio for use in computing settlement S (Chapter 7)
$\Delta P/\Delta V$ = slope of the straight-line portion of the pressuremeter curve (Chapter 4)
ΔV_w = change in the volume of water (Chapter 3)
Δw_b = base settlement (Chapter 13)
Φ_c = friction angle at the interface of concrete and soil (Chapter 11)
σ_1 = compressive stress (Chapter 14)
σ_f = failure compressive stress in the laboratory unconfined-compression or quick triaxial test (Chapter 13)
σ_h = normal component of stress at the pile–soil interface (Chapter 10)
σ'_p = preconsolidation pressure (Chapter 11), vertical effective stress at a horizontal plane in a given depth (Chapter 11)
σ'_v = change in minor principal total stress (Chapter 10), vertical effective stress at a horizontal plane in any given depth (Chapter 11), preconsolidation pressure (Chapter 11)
σ'_{vo} = value of vertical effective stress at the elevation of the base (Chapter 11)
σ'_z = vertical effective stress in soil at depth z (Chapter 11)
$\Delta\sigma_1$ = change in the major principal total stress (Chapter 3)
$\Delta\sigma_3$ = change in a minor principal total stress (Chapter 3)
δ = friction angle between the soil and the pile (Chapter 10), thickness of individual discontinuities (Chapter 11)
ε = strain measured by the unconfined-compression or quick-triaxial test (Chapter 13), strain corresponding to compressive stress σ_1 (Chapter 14)
ε_z = strain at any depth z beneath a loaded area (Chapter 9)
γ = unit weight (Chapter 3), united weight of embankment material (Chapter 3), unit weight of soil (Chapters 4, 7, 10, and 14)
γ' = effective unit weight (Chapter 3), submerged unit weight (Chapter 7), effective unit weight of soil (Chapter 10), average effective unit weight from the ground surface to the p-y curve (Chapter 14)
γ_1 = partial load factor to ensure a safe level of loading (Chapter 8)
γ_2 = partial load factor to account for any modifications during construction, for effects of temperature, and for effects of creep (Chapter 8)
γ_c = unit weight of concrete (Chapter 11)
γ'_c = buoyant unit weight of concrete (Chapter 11)
γ_d = dry unit weight (Chapter 3)
γD_f = soil above the base of the foundation (Chapter 7)
γ_f = partial safety factor to account for deficiencies in fabrication or construction (Chapter 8)

γ_m = partial safety factor to reduce the strength of the material to a safe value (Chapter 8)
γ_p = partial safety factor to account for inadequacies in the theory or model for design (Chapter 8)
γ_s = unit weight of the solid mineral grains without any internal voids (Chapter 3)
γ_{sat} = saturated unit weight of a solid (Chapter 3)
γ_w = unit weight of water (Chapter 3)
κ = diffusivity that reflects the ability of the slab material to transmit heat (Chapter 7), reduction factor for shearing resistance along the face of the pile (Chapter 14)
λ = coefficient that is a function of pile penetration (Chapter 10)
μ = coefficient of friction (Chapter 3), modulus in the load transfer curve (Chapter 13)
μL = lateral extent influence factor for elastic settlement (Chapter 13)
ϕ = friction angle (Chapter 14)
ϕ' = friction angle from effective stress analysis (Chapter 9)
ϕ_{pl} = friction angle for plain strain conditions (Chapter 7)
ϕ_{tr} = friction angle determined from triaxial tests (Chapter 7)
φ = friction angle (Chapters 4, 6, and 10)
θ = angle of slope as measured from the horizontal (Chapter 14)
ρ = mean settlement (Chapter 9)
σ = normal stress (Chapter 3), total stress (Chapter 3)
σ' = effective stress (Chapter 3), log of effective stress (Chapter 7)
σ'_0 = depth to the water table from the ground surface (Chapter 9)
σ'_v = effective overburden pressure (Chapter 10)
σ_0 = vertical stress at the ground surface due to the applied load (Chapter 7)
σ_n = normal stress between the concrete and the borehole wall at the time of loading (Chapter 11)
σ_p = value of atmospheric pressure in units (Chapter 11)
σ'_p = preconsolidation pressure (Chapter 11)
σ_v = stress in the vertical direction (Chapter 7)
τ = shear stress (Chapter 3)
ω = angle of the pile taper (Chapter 10)
ψ = $c/\overline{p}$ for the depth of interest (Chapter 10)
ℓ = circumference of a cylindrical pile or the perimeter encompassing an H-pile (Chapter 13)